National Aeronautics and Space Administration

Technology Opportunity

Technology Transfer & Partnership Office

TOP3–00219

9- by 15-Foot Low-Speed Wind Tunnel

Facility

The 9- by 15-Foot Low-Speed Wind Tunnel (LSWT) is the most utilized low-speed propulsion acoustic facility in the world. It is the only national facility that can simulate takeoff, approach, and landing in a continuous subsonic flow wind tunnel environment. This facility specializes in evaluating aerodynamic performance and acoustic characteristics of fans, nozzles, inlets, propellers, and hot gas-ingestion of advanced Short Takeoff Vertical Landing (STOVL) systems.

Facility Description

- Calibrated and documented test section conditions
- Real-time data acquisition and display in both alphanumeric and graphical format
- Standardized data acquisition systems at all Glenn wind tunnel facilities
- Aerodynamic and propulsion cycle operating modes
- Model support systems (hydraulics, exhaust, high-pressure air, fuels, etc.)
- New unique rotor-alone nacelle test capability making it possible to isolate fan-alone noise
- 1,000 and 2,000 counter-rotating, and 5,000 hp high-speed fan drive rigs, using heated compressed air, can be mounted on two turntable systems
- Laser Doppler Velocimetry and flow visualization systems—laser sheet, oil flow, and pressure-sensitive paint
- Experienced staff of technicians, engineers, researchers, and operators
- Accommodates government and private industry research programs

Commercial Applications

- Engine system noise reduction
- Fan noise prediction codes and measurement methods
- Low-speed flight applications for aircraft
- Advanced propulsion system components
- High-speed and counter-rotating fans
- Airport noise

Programs and Projects Supported

- Ultra-Efficient Engine Technology (UEET)
- Quiet Aircraft Technology (QAT)
- Versatile Affordable Advanced Turbine Engine
- Joint Strike Fighter
- Advanced Tactical Fighter

Short Takeoff Vertical Landing (STOVL) hot gas ingestion model.

Capabilities

9×15 Low Speed	
Test section speed, Mach	0.0 to 0.23 (0 to 175 mph) (0 to 150 knots)
Simulated altitude, ft	Sea level
Test section Reynolds number/ft	0 to 1.4×10^6
Dynamic pressure, lbf/ft^2	0 to 72
Test section total temperature, °R	Ambient to 550
Auxiliary air supply At 40 psig At 150 psig At 450 psig Model exhaust	(heated) 30 lbm/s 30 lbm/s 30 lbm/s Variable
High-pressure air (2,600 psig) storage, scf	981,000
Fuels	Gaseous hydrogen

Facility Testing Information

http://facilities.grc.nasa.gov

Contacts

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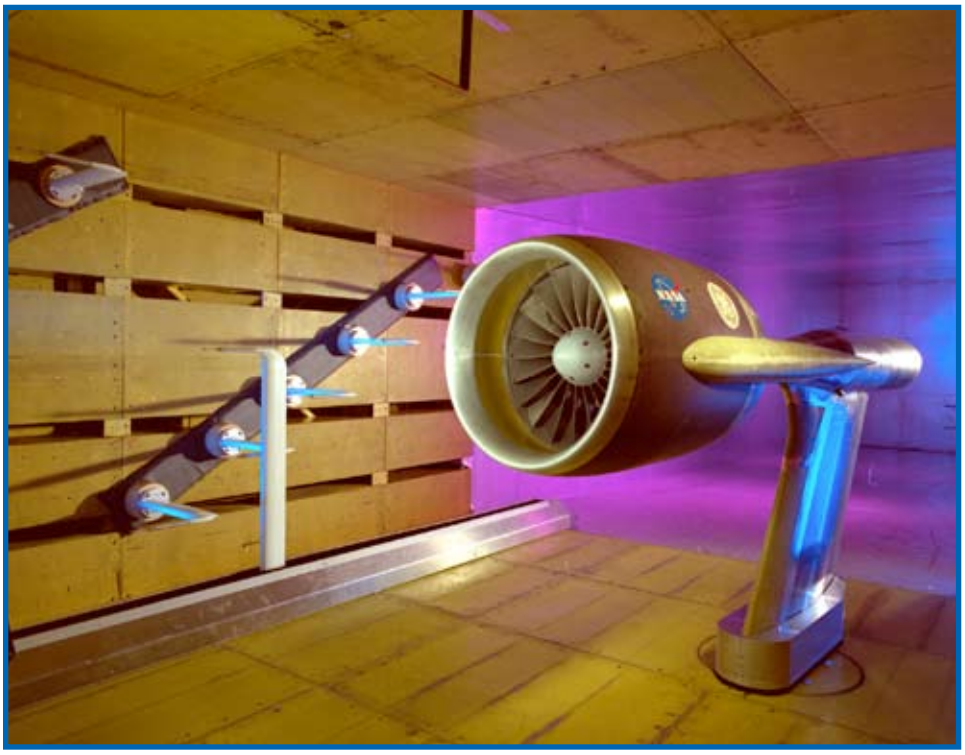

General Electric universal propulsion simulator model in 9- by 15-Foot Low-Speed Wind Tunnel.

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